REMARKS

Claims 1-16 are pending in the case. All claims stand rejected. In the present submission, claims 1-4 have been amended and claims 9-16 have been cancelled. Reconsideration is respectfully requested.

§101 Rejection

The Examiner has rejected claims 1-16 under 35 U.S.C. §101 because the claimed invention is directed to non-statutory subject matter. (See Office Action, p.2.) In particular, the Examiner contends, among other things, that the "instant claims merely mathematically index the frames in a signal, without performing any tangible physical result or change in the signal, and as such are not statutory subject matter." *Id.*

In the present submission, claims 9-16 have been cancelled and the rejection as to these claims is thus moot. With regard to claims 1-8, Applicant respectfully traverses the rejection.

In the present amendment, claims 1-4 have been amended to clarify the claims. For example, claim 1 has been amended to make clear that the "designated preamble" has the selected length and the associated pseudo-noise signal. This amendment is support by Applicant's specification, page 2, lines 16-18.

Furthermore, in claim 1, the letter "M" has been erroneously used to represent two quantities (the M+1 consecutive frames and the Mth order). Claims 1-4 have been amended to replace the term "Mth order" with "pth order" to indicate that the two quantities M and p have different values and are not the same. The present claim amendment is supported by Applicant's specification, such as by the Summary of the Invention (page 1, lines 26-29, of Applicant's specification) and also page 4, line 21, to page 6, line 29.

Claim 1 has also been amended to recite that the "frame number" provided by the claimed invention uniquely identifies at least one frame in the M+1 consecutive OFDM frames. The claim amendment is supported by Applicant's specification, such as by the Summary of the Invention (page 1, lines 26-29, of Applicant's specification) and also page 4, lines 24-29.

Applicable Law and Examination Guidelines

To constitute statutory subject matter, "[t]he claimed invention as a whole must accomplish a practical application. That is, it must produce a '**useful, concrete and tangible result.**'" See MPEP §2106, section II-A, citing *State Street Bank & Trust Co. v. Signature Financial Group Inc.*, 149 F.3d 1368, 1373 (Fed. Cir. 1998); emphasis added. "Accordingly, a complete disclosure should contain some indication of the practical application for the claimed invention, i.e., why the applicant believes the claimed invention is useful." *Id.* Furthermore, "[t]he claimed invention as a whole must produce a '**useful, concrete and tangible' result** to have a practical application." *Id.*; emphasis added.

The "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" issued by the U.S. Patent Office and published in the Official Gazette on November 22, 2005, iterate similar statements of law regarding compliance with the statutory subject matter requirement under 35 U.S.C. §101. More specifically, the Guidelines state that:

> For claims including such excluded subject matter to be eligible, the **claim must be for a practical application of the abstract idea**, law of nature, or natural phenomenon. Diehr, 450 U.S. at 187, 209 USPQ at 8 ("application of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection."); Benson, 409 U.S. at 71, 175 USPQ at 676 (rejecting formula claim because it "has no substantial practical application").
>
> **To satisfy section 101 requirements, the claim must be for a practical application of the Sec. 101 judicial exception, which can be identified in various ways:**
>
> . The claimed invention "transforms" an article or physical object to a different state or thing.
>
> . **The claimed invention otherwise produces a useful, concrete and tangible result**, based on the factors discussed below.
>
> (Emphasis added.)

In MPEP §2106, section II-A, several examples of claimed inventions that have a practical application because they produce useful, concrete, and tangible result are given. The following two examples are of particular interest:

> - Claims drawn to **a long-distance telephone billing process** containing mathematical algorithms were held to be directed to patentable subject matter because "the claimed process applies the

> Boolean principle to produce a useful, concrete, tangible result without pre-empting other uses of the mathematical principle." *AT&T Corp. v. Excel Communications, Inc.*, 172 F.3d 1352, 1358, 50 USPQ2d 1447, 1452 (Fed. Cir. 1999);
>
> - "[T]ransformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces 'a useful, concrete and tangible result' -- **a final share price momentarily fixed for recording and reporting purposes** and even accepted and relied upon by regulatory authorities and in subsequent trades." *State Street*, 149 F.3d at 1373, 47 USPQ2d at 1601...(MPEP §2106, section II-A; emphasis added.)

In the *AT&T* case, the claimed invention of the patent is "a message record for long-distance telephone calls that is enhanced by adding a primary interexchange carrier ("PIC") indicator. The addition of the indicator aids long-distance carriers in providing differential billing treatment for subscribers, depending upon whether a subscriber calls someone with the same or a different long-distance carrier...The PIC indicator therefore enables IXCs to provide differential billing for calls on the basis of the identified PIC." *AT&T*, at 1353-1354.

It is important to note from the above two examples that while a method must provide a useful, concrete and tangible result to constitute statutory subject matter, there is no requirement that the claimed invention includes the actual use or the actual application of that result (the "PIC indicator" or the "final share price"). For example, the *AT&T* patent provides a PIC indicator that is ***to be used*** by long-distance carriers and the State Street patent provides a final share price that is ***to be used*** for recording and reporting purposes. However, the claimed inventions of those two patents do not include the actual application and use of their respective useful, concrete and tangible results.

MPEP §2106 also provides the examination guidelines in determining patentable subject matter for computer-related inventions. Among other things, MPEP §2106, section II, suggests that "[o]ffice personnel should **review the entire disclosure** to determine the features necessary to accomplish at least one asserted practical application" (emphasis added). Furthermore, "when evaluating the scope of a claim, **every limitation in the claim must be considered.** Office personnel may not dissect a claimed invention into discrete elements and

then evaluate the elements in isolation. Instead, **the claim as a whole must be considered.** See, e.g., *Diamond v. Diehr*, 450 U.S. at 188-89..." (Emphasis added).

Claim 1

Claim 1, as amended, recites:

> 1. A method for determining a number of a frame in a sequence of two or more frames, the method comprising:
>
> receiving a sequence of at least M+1 consecutive OFDM frames, each frame having an index m, having a designated preamble wherein the designated preamble has a selected length N1 and an associated pseudo-noise signal PN(t;m) (m = 0, ... , M; M≥1);
>
> **providing an overlap function OF(m;k) of the designated preambles** with each of a sequence of selected reference signals, indexed by k = 1, 2, ... , K where K is a selected integer, and **determining a phase ϕ(m)** corresponding to a location of a maximum amplitude of the overlap functions OF(m;k) for each of the M+1 designated preambles of the sequence of at least M+1 consecutive OFDM frames;
>
> **forming a selected pth order phase difference** of the phases ϕ(m); and
>
> **comparing the pth order difference** with a selected table of pth order phase differences **to determine a frame number of at least one frame of the M+1 consecutive OFDM frames, the frame number uniquely identifying the at least one frame** in the M+1 consecutive OFDM frames. (Emphasis added.)

The claimed invention of claim 1 provides a method to determine the unique frame number of a signal frame in a sequence of signal frames. The claimed invention of claim 1 applies an "overlap function" and determines a selected pth order phase difference where the pth order phase difference is used to determine a frame number for a frame in the sequence of signal frames where the frame number uniquely identifies the frame. This "frame number" generated by the claimed invention of claim 1 is a useful, concrete and tangible result of the claimed invention.

Contrary to the Examiner's assertion, the claim invention does not operate merely to mathematically index the frames. Rather, the claimed method of claim 1 receives signal frames where each frame is already assigned with an index corresponding to the frame number. The problem solved by the claimed invention is to accurately determine the frame

number of the received frames. In other words, the claimed invention provides a method to uniquely identify each frame in the received signal frames. The identification of the unique frame number of each signal frame in a sequence of signal frames is a useful, concrete and tangible result.

As explained in Applicant's specification, page 1, lines 7-18:

> **In certain communication systems that rely upon use of pseudo-noise techniques for signal discrimination, signals are transmitted within each of a sequence of frames,** with each frame including a pseudo-noise preamble or post-amble section of a selected length L1 (expressed in bits or symbols) and a data section of length L2....
>
> **What is needed is an approach that provides an identification of frame number** using a computable value associated with a pseudo-noise signal associated with a preamble (or post-amble) of the frame. **Preferably, this approach should provide a unique correspondence between a computable value and a frame id.** (Emphasis added.)

Thus, Applicant's specification clearly set forth the problem needed to be solved – determining the unique frame ID of a signal frame in a sequence of frames. The solution implemented by the claimed invention is through the application of the overlap function and the computation of the pth order phase difference. The pth order phase difference is compared with a set of reference values to determine the unique frame number for each signal frame. (See generally, Applicant's specification, page 3, line 1, to page 4, line 27.)

Just as in the cases of *AT&T* and *State Street*, the claimed invention of claim 1 receives information, processes the information and generates a useful, concrete and tangible result in the form of a ***frame number*** which may be temporarily stored and then used or relied upon by other parts of a communication system. Therefore, the claimed invention of claim 1 ***as a whole*** provides a useful, concrete and tangible result and accomplishes a practical application. Hence, claim 1 recites statutory subject matter under 35 U.S.C. §101.

Claims 2-8

Claims 2-8, dependent upon claim 1, recite statutory subject matter under 35 U.S.C. §101 for the same reasons as the associated independent claim.

For the above reasons, Applicant submits that claims 1-8 are directed to statutory subject matter. Withdrawal of the §101 rejection is respectfully requested.

CONCLUSION

After the present amendment, claims 1-8 are pending in the case. For the reasons stated above, the application is in condition for allowance and passage of the present case to allowance is respectfully requested. If the Examiner would like to discuss any aspect of this application, the Examiner is invited to contact the undersigned at (408) 382-0480.

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I hereby certify that this correspondence is being facsimile transmitted to the United States Patent and Trademark Office, Fax No. (571)273-8300 on the date shown below.

Attorney for Applicant(s) March 30, 2006 Date of Signature

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